AMENDMENTS TO THE CLAIMS

Please add claims 28 and 29 and amend claims 1, 19, 20, and 25 as follows:

1. (Currently Amended) A method of controlling a conductivity of a Ga_2O_3 system single crystal, comprising:

adding an n-type dopant to the Ga_2O_3 system single crystal manufactured from bulk growth to change a resistivity of said Ga_2O_3 system single crystal substantially linearly with an added amount of the n-type dopant,

wherein said n-type dopant comprises ~~an n-type dopant for controlling said conductivity of the Ga_2O_3 system single crystal comprising~~ one of Zr, Si, Hf, Ge, Sn, and Ti.

2. – 3. (Canceled).

4. (Previously Presented) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1, wherein a value of 2.0×10^{-3} to 8.0×10^{2} Ωcm is obtained as the resistivity by said adding said n-type dopant.

5. (Previously Presented) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 4, wherein a carrier concentration of the Ga_2O_3 system single crystal is controlled to fall within a range of 5.5×10^{15} to $2.0 \times 10^{19}/cm^3$ as a range of the resistivity.

6. – 7. (Canceled).

8. (Previously Presented) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1, wherein said Ga_2O_3 system single crystal is prepared with a Ga_2O_3 polycrystalline raw material, and

wherein the Ga_2O_3 polycrystalline raw material has a purity of 6N.

9. – 13. (Canceled).

14. (Withdrawn) A light emitting element, comprising:

an n-type β-$AlGaO_3$ cladding layer, an active layer, a p-type β-$AlGaO_3$ cladding layer, and a p-type β-Ga_2O_3 contact layer respectively laminated in order on an n-type β-Ga_2O_3 substrate, said p-type β-Ga_2O_3 contact layer and said n-type β-Ga_2O_3 substrate comprising a β-Ga_2O_3 single crystal;

a transparent electrode and a pad electrode respectively formed in order on said p-type β-Ga_2O_3 contact layer; and

an n-side electrode formed under a lower surface of said n-type β-Ga_2O_3 substrate,

wherein a resistivity of said β-Ga_2O_3 single crystal is in a range of 2.0×10^{-3} to 8.0×10^{2} Ωcm,

wherein a carrier concentration of said β-Ga_2O_3 single crystal is within a range of 5.5×10^{15} to $2.0 \times 10^{19}/cm^3$,

wherein said n-type layers comprise a dopant including one of Si, Zr, Hf, Ge, Sn, and Ti, and

wherein said p-type layers comprise a dopant including one of H, Li, Na, K, Rb, Cs, Fr, Be, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, Mg, and Pb.

15. (Withdrawn) The light emitting element of claim 14, wherein a carrier concentration of said p-type β-Ga_2O_3 contact layer is greater than that of said p-type β-$AlGaO_3$ cladding layer; and

wherein a carrier concentration of said n-type β-Ga_2O_3 substrate is greater than that of said n-type β-$AlGaO_3$ cladding layer.

16. (Previously Presented) A method of controlling a conductivity of a Ga_2O_3 system single crystal, comprising:

contacting a Ga_2O_3 polycrystalline raw material comprising a predetermined dopant to a Ga_2O_3 seed crystal; and

growing the Ga_2O_3 system single crystal on the Ga_2O_3 seed crystal such that said predetermined dopant is substituted for Ga in the Ga_2O_3 system single crystal to obtain a desired resistivity in the Ga_2O_3 system single crystal of 1×10^3 Ωcm or greater,

wherein said predetermined dopant comprises a p-type dopant for controlling said conductivity of the Ga_2O_3 system single crystal, said p-type dopant comprising one of H, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Pb.

17. (Withdrawn) The light emitting element according to claim 14, wherein the active layer comprises β-$GaInO_3$.

18. (Previously Presented) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 16, wherein said Ga_2O_3 polycrystalline raw material has a purity of 6N.

19. (Currently Amended) A method of manufacturing a Ga_2O_3 system single crystal, comprising:

adding an n-type dopant to the Ga_2O_3 system single crystal, the n-type dopant comprising one of Zr, Si, Hf, Ge, Sn, and Ti; and

manufacturing the Ga_2O_3 system single crystal from bulk growth having a resistivity depending on an added amount of the n-type dopant by changing the resistivity of the Ga_2O_3 system single crystal substantially linearly with the added amount of the n-type dopant.

20. (Withdrawn – Currently Amended) A Ga_2O_3 system single crystal comprising:

an n-type dopant, said n-type dopant comprising one of Zr, Si, Hf, Ge, Sn, and Ti; and

a resistivity that depends on an added amount of said n-type dopant such that the added amount of the n-type dopant changes the resistivity substantially linearly.

21. (Previously Presented) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 16, wherein said conductivity of the Ga_2O_3 system single crystal is exclusively dependent on an added amount of said p-type dopant.

22. (Withdrawn) A light emitting element, comprising:

an n-type β-Ga_2O_3 contact layer, an n-type β-$AlGaO_3$ cladding layer, an active layer, a p-type β-$AlGaO_3$ cladding layer, and a p-type β-Ga_2O_3 contact layer respectively laminated in order on an insulation type β-Ga_2O_3 substrate, said p-type β-Ga_2O_3 contact layer, said n-type β-Ga_2O_3 substrate, and said insulation type β-Ga_2O_3 substrate comprising a β-Ga_2O_3 single crystal;

a transparent electrode and a pad electrode respectively formed in order on said p-type β-Ga_2O_3 contact layer; and

an n-side electrode formed on said n-type β-Ga_2O_3 contact layer,

wherein said p-type layers comprise a dopant including one of H, Li, Na, K, Rb, Cs, Fr, Be, Mg, Ca, Sr, Ba, Ra, Mn, Fe, Co, Ni, Pd, Cu, Ag, Au, Zn, Cd, Hg, Tl, and Rb,

wherein said n-type layers comprise a dopant including one of Si, Hf, Ge, Sn, Zr, and Ti, and

wherein a resistivity of said insulation type β-Ga_2O_3 substrate is 1×10^3 Ωcm or greater.

23. (Withdrawn) The light emitting element according to claim 22, wherein a carrier concentration of said p-type β-Ga_2O_3 contact layer is greater than that of said p-type β-$AlGaO_3$ cladding layer, and

wherein a carrier concentration of said n-type β-Ga_2O_3 contact layer is greater than that of said n-type β-$AlGaO_3$ cladding layer.

24. (Withdrawn) The light emitting element according to claim 22, wherein said active layer comprises β-$GaInO_3$.

25. (Currently Amended) The method of manufacturing a Ga_2O_3 system single crystal according to claim 19, wherein ~~adding~~ said n-type dopant comprises one of Si, Hf, and Sn.

26. (Previously Presented) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1, wherein the n-type dopant comprises one of Si, Hf, and Sn.

27. (Withdrawn) The Ga_2O_3 system single crystal according to claim 20, wherein said n-type dopant comprises one of Si, Hf, and Sn.

28. (New) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1, wherein the n-type dopant comprises one of Si and Hf.

29. (New) The method of controlling a conductivity of a Ga_2O_3 system single crystal according to claim 1, wherein said adding said n-type dopant is performed at room temperature.